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term "X-ray." Dependant claim 9 and independant claim 10 have been amended to specify MCM-22 with an Alpha Value greater than about 170 as supported by the combination of the inherent requirements for its use in hydroalkylation of aromatic compounds, the Declaration by Dr. Jane Cheng, and the teachings of Del Rossi et al. Claim 11 has been amended to list specific catalysts having the specified X-ray diffraction pattern.

Reconsideration and withdrawal of the rejections of record are respectfully requested.

Summary of Status of Amendments and Office Action

Claims 7 and 9 through 11 have been amended. Thus, claims 7 to 11 are presently pending in the application, claims 7, 10, and 11 being independent.

In the Final Office Action, claims 7 to 11 are rejected under 35 U.S.C. § 102(b) as being anticipated by Del Rossi et al. (U.S. Patent No. 5,108,969). Claims 7 to 11 are also rejected under 35 U.S.C. § 103(a) as being unpatentable over Del Rossi et al. (U.S. Patent No. 5,108,969).

Response to the Rejection of Claims 7 to 11 under 35 U.S.C. § 102(b)

Claims 7 to 11 are rejected under 35 U.S.C. § 102(b) as being anticipated by Del Rossi et al. (U.S. Patent No. 5,108,969).

In the Office Action, page 2, lines 18 to 21, the Examiner states that the Del Rossi et al. patent discloses a catalyst composition useful in hydrocarbon conversion processes and that the Del Rossi et al. patent, column 8, lines 37 to 46 and claim 1, "teaches and claims an MCM-22 zeolite having a group VIII metal and tin thereon". The Examiner acknowledges that Del Rossi et al. do not "specifically teach the metal ruthenium" but rather teach Group VIII metals. Notwithstanding this, the Examiner further states at page 3, lines 10 to 13, that "one of ordinary skill would have been able to at once envision ruthenium as a group VIII metal taught by the reference."

Applicants respectfully disagree with the Examiner's position. In particular, Applicants direct the Examiner's attention to the title and the abstract of the Del Rossi et

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al. patent. The Del Rossi et al. patent is directed to a "Low Acidity Catalyst for Conversion of Paraffins to Olefins and/or Aromatics," and describes a zeolite which has been modified to reduce the acidity, as measured by Alpha Value. The examples in the Del Rossi et al. patent show as-synthesized MCM-22 samples with Alpha Values of 173 and higher then describe treatments and modifications to reduce the Alpha Values of those samples to Alpha Values between 1 and 22.

The present invention does not mention or require any treatment to reduce Alpha Value. In fact, a catalyst with reduced Alpha Value would be unsuitable for the hydroalkylation of aromatic compounds described in the present application. Please note that claims 7 through 11 are all directed to "a catalyst suitable for the hydroalkylation of aromatic compounds." Although it may be redundant, claims 9 and 10 have been amended to specify MCM-22 having an Alpha Value greater than about 170, based on the disclosures of Del Rossi, et al. of MCM-22 which would not be applied to that invention. The attached Article 132 Declaration by Dr. Jane Cheng provides further support for the difference between the MCM-22 described in the present application and the low-acidity MCM-22 described by Del Rossi et al. Dr. Cheng states that it would have been counter-intuitive to apply a catalyst described by Del Rossi et al. to hydroalkylation of aromatic hydrocarbons.

It is respectfully submitted that the Del Rossi et al. patent does not anticipate the invention presently claimed. For the foregoing reasons, Applicants respectfully submit that earlier amendments limiting the metals combined with MCM-22 were based on a misunderstanding of the Del Rossi et al. patent and were not necessary to enhance patentability, and respectfully request that the Examiner withdraw both the present and all prior rejections to claim 7 as originally filed.

Response to the Rejection of Claims 7 to 11 under 35 U.S.C. § 103(a)

Claims 7 to 11 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Del Rossi et al. (U.S. Patent No. 5,108,969).

In the Office Action, the Examiner states that the Del Rossi et al. patent is applied in the same manner as in the rejection under 35 U.S.C. § 102(b). As was clarified above,

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Del Rossi et al. describe a low acidity catalyst which would be unsuitable for hydroalkylation of aromatic compounds and further shows unexpected results. Since Del Rossi et al. use a different catalyst outside the scope of claims 7 through 11, and use that catalyst for a different reaction process, it is respectfully submitted that there is no *prima facie* case of obviousness.

Response to Prior Rejections of Claims 7 to 11)

For the sake of completeness, Applicants also wish to address the Dessau et al. patent (U.S. Patent No. 5,292,976) cited by the Examiner in the first Office Action, dated December 20, 2000. It is respectfully noted that Dessau et al. describe "modified non-acidic zeolite catalyst particles" in the abstract and further go on to describe acidity in column 6, line 44 through column 7, line 8. Alpha Value is discussed as a measure of acidity and preferred ranges are designated for the second stage catalyst. However, it is stated that non-acidic zeolites are preferred for the first stage catalyst (Column 6, line 47) which is combined with Group VIII and optionally modified by Group IVB. This preference is followed by a description of techniques for reducing or eliminating acidity in zeolites. It should be noted that MCM-22 is described as having a "high Alpha Value, usually above 150." (column 6, lines 17 to 20) Again, as was the case with the material described by Del Rossi et al., the reduced acidity or non-acidic MCM-22 combined with various metals described by Dessau, et al. and the reaction to which it applies are very different from the untreated MCM-22 and reaction functionality required for the present invention. It is respectfully submitted that Dessau et al. neither anticipate nor teach the present invention.

Further, Applicants wish to address the Tsao et al. patent (U.S. Patent No. 5,384,296) cited by the Examiner in the second Office Action, dated May 9, 2001, as the basis for rejection under 35 U.S.C. 102(b). It is noted that although Tsao et al. disclose MCM-22, they also disclose 18 other zeolites, list 6 Group VIII metals, and 7 optional non-noble metal promoters, resulting in thousands of possible combinations. There is no disclosure in Tsao to direct the skilled worker to select the particular combinations of zeolite, Group VIII metal, and metal promoter described in the present claims.

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Applicants respectfully note that the Tsao disclosures are also made in the context of restrictions which would render them unsuitable for the hydroalkylation of an aromatic hydrocarbon. The Tsao et al. invention requires special treatments to convert framework aluminum to non-framework alumina occupying the pore structure. As part of this treatment, it is noted that the Alpha Value should be reduced "at least 50%, preferably 70%, and more preferably 90%." (column 7, lines 39 to 40) As discussed above, such a reduction in Alpha Value with respect to MCM-22 would result in a catalyst not within the scope of the present invention.

It is known that a reference "must clearly and unequivocally disclose the claimed compound or direct those skilled in the art to the compound without any need for picking, choosing, and combining various disclosures not directly related to each other by the teachings of the cited reference," *In re Arkley*, 445 F.2d 586, 172 U.S.P.Q. 524 (CCPA 1972). Moreover, it has been held that for a prior publication to be sufficient to defeat a patent it must exhibit a substantial representation in such full, clear and exact terms that one skilled in the art may make, construct and practice the invention without having to depend on either the patent or his own inventive skills," *Philips Electronic & Pharmaceutical Industries v. Thermal & Electronics Industries*, 450 F.2d 1164, 171 U.S.P.Q. 641 (2d Cir. 1971). It is respectfully submitted that the combinations and restrictions of the present invention are neither anticipated by nor obvious with respect to the disclosures of Tsao et al.

For the foregoing reasons, Applicants respectfully request that the Examiner withdraw the current and all prior rejections.

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CONCLUSION

For the reasons advanced above, Applicants respectfully submit that all pending claims patentably define Applicants' invention. Entry of this Amendment and allowance of the application is earnestly solicited.

Should the Examiner have any further comments or questions, the Examiner is invited to contact the undersigned at the below-listed telephone number.

Respectfully submitted,

Date 3/10/03


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PatentAPPENDIXMarked up copy of Claims

8. (Twice Amended) A catalyst suitable for the hydroalkylation of an aromatic hydrocarbon comprising

- (a) a first metal having hydrogenation activity [in the form of] and selected from palladium, ruthenium, nickel, or cobalt;
- (b) a second metal, different from the first metal, selected from zinc, tin, nickel [and] or cobalt; and
- (c) a crystalline inorganic oxide material having an X-ray diffraction pattern including the following d-spacing maxima 12.4 ± 0.25 , 6.9 ± 0.15 , 3.57 ± 0.07 and 3.42 ± 0.07 .

9. (First Amended) The catalyst of claim 7 wherein the crystalline inorganic oxide material is MCM-22 having an Alpha value greater than about 170.

10. (Three Times Amended) A catalyst suitable for the hydroalkylation of an aromatic hydrocarbon comprising:

- (a) MCM-22 zeolite having an Alpha value greater than about 170;
- (b) ruthenium; and
- (c) tin.

11. (Amended) A catalyst suitable for the hydroalkylation of an aromatic hydrocarbon comprising:

[(c) a crystalline inorganic oxide material having a X-ray diffraction pattern including the following d-spacing maxima 12.4 ± 0.25 , 6.9 ± 0.15 , 3.57 ± 0.07 and 3.42 ± 0.07 ;]

[(a)] ruthenium; [and]

[(b)] tin; and

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a crystalline inorganic oxide material having an X-ray diffraction pattern including the following d-spacing maxima 12.4 ± 0.25 , 6.9 ± 0.15 , 3.57 ± 0.07 and 3.42 ± 0.07 , wherein the crystalline inorganic oxide material is selected from PSH-3, SSZ-25, MCM-36, MCM-49 or MCM-56.